Patrick Moorhead: Randhir, thank you so much for coming on The Six Five Summit. It's great to see you.

Randhir Thakur: Well, thank you for having me, Patrick. It's a pleasure to be with you today.

Patrick Moorhead: Yeah, it's super. So semiconductors are hot. I mean, they're having their moment on the global stage, sometimes not for the best reasons, right? With the chip shortage, but companies in that sector, that some people had never heard of before, are coming to the forefront and even household names. So well, I'd love to start off with this, because you're in the middle of all this, is your view of the state of the industry, what is the demand outlook? How bad is the chip shortage and when do you expect it to end?

Randhir Thakur: Oh, thank you, Patrick. I don't think anyone can deny that these are unprecedented times. I have been in this industry for more than 30 years and this is the first time I can remember chips being the subject of regular dinner table conversations with friends and family. People are feeling the effect of supply chain disruptions. The chip shortages cost the US economy about $240 billion last year and we expect the industry to continue to see challenges until at least 2024 in areas like foundry capacity and tool availability. Looking ahead, we are seeing some softening in low end consumer pieces, but the demand signals from customers remain strong across the enterprise, cloud, AI graphics and networking. We continue to believe this is the beginning of a long term cycle for semiconductors. Everything in our world is becoming digital, a trend that has been accelerated by the global pandemic and digitization driver demand for chips. Semiconductors are fueling the transformation across a wide range of industries. At Intel, we are executing on a long term growth strategy to unlock what we see as a $1 trillion market opportunity in semiconductors.

Patrick Moorhead: Chips are strategic. I've been saying this for over 30 years and it's good to see that we have a lot more people agreeing with us here. So particularly since Pat came back on the scene here, a key part of your corporate growth strategy involves you opening up your fabs to provide foundry capacity to semiconductor designers. Intel has tried this before and I get a lot of questions about, hey, what's different this time, right? Does the world need another semiconductor foundry?

Randhir Thakur: I'm tempted to simply say that everything is different. While that would be true in many respects, let me be a bit more precise. The world has changed and Intel has also changed. Let's start with the world. If the past two years have taught us anything, it's that we need a more resilient supply of semiconductors. Recent events have shined a renewed spotlight on the importance of this strategic industry, from supply chain disruptions caused by the global pandemic to a geopolitical instabilities in several parts of the world. In my previous role as Intel's chief supply chain officer, every day I saw firsthand the importance of supply chain resilience in managing a globally connected factory network. The rest of the world is now getting a dose of this reality. So how can we build a more resilient supply chain? Today, the global supply of chips is out of balance. More than 80% of chip capacity, as you know, is now concentrated in Asia.

This over reliance in one region of the world introduces significant risk. At Intel, we believe a geographically balanced supply chain, a resilient supply chain and we are investing accordingly with significant expansion plans in the United States and Europe. At the same time, Intel has changed. We have new leadership and a renewed sense of purpose. Our CEO, Pat Gelsinger, came on board and set a bold strategy to double down on manufacturing. We are making major investments in both technology and capacity to prove we are serious. These investments are not only for Intel's product leadership, but we are opening our capabilities to serve the insatiable demand from fabless chip designers. That's where Intel foundry services comes in. We have embraced a really a new era of openness and we are collaborating across the industry to leverage the best of the foundry ecosystem. When you add that to our unique capabilities as an idea, it produces a powerful combination.

Patrick Moorhead: Yeah, so the world has definitely changed. And from everything I've seen so far out of Intel, Intel is changing and the world needs Intel to do this, that's for sure. And I've heard Pat Gelsinger describe the next decade as an era of sustained demand. Now, part of that is going to be from demand from external foundry, but also from the growth in Intel's product portfolio. Where is the demand coming from?

Randhir Thakur: Well, foundry is growing even faster than the broader semiconductor space. The foundry market is expected to nearly double over the course of this decade as you know, from 95 billion today to 180 billion by 2030. So leading edge technologies will be 70% of the market by 2030, that represents a nearly 20% growth rate compared to today. As one of only three companies in the world of making leading edge semiconductor chips, we are in a great position to capitalize on this growth with IFS. Simultaneously, specialty technologies will continue to provide differentiated solutions on mature nodes. With our planned acquisition of power semiconductor will gain an extensive portfolio of specialty technologies to address a broad spectrum of customer needs. There's so much customer pull. Foundry customers are increasingly looking for end to end solutions. What's truly exciting about IFS, Patrick, is that we are building a system level foundry. We are not just selling wafers. We will offer packaging, design services, specialty technologies and much more. We are leveraging 50 years of innovation to amplify the impact of Intel through IFS.

Patrick Moorhead: Yeah, I like the end-end approach. And I think that's what customers are asking for. The question I have though, is there's a lot of different applications and markets out there driving growth for foundry. And I was wondering, which ones are you going for? Today foundry volumes seem to be primarily driven by the latest smartphone, APs from companies like Apple and Qualcomm. Is that where you're going to be looking forward to your growth?

Randhir Thakur: At IFS, a great question. We are focused on three primary markets, mobile, compute and automotive. These three segments are expected to comprise about 85% of the market by 2030. As you highlighted, Patrick, mobile is a big piece of the pie today and will continue to be very important going forward. Our leading edge technology has compelling low power and high performance attributes. Combined with Tower's strong RF front end and power management capabilities, will offer complete solution for mobile customers. However, we are seeing strategic inflections in the other segments that are driving new growth opportunities. In high

performance compute the trend is towards domain specific architecture to build accelerators for customer workloads. In automotive, electrification and autonomy are driving an entirely new approach to in vehicle semiconductors.

Patrick Moorhead: In compute, you mentioned the move to domain specific and in our research and quite frankly, my conversation every week with some of the major cloud providers, who are designing their own custom chips for specific workloads especially in AI, and I think some people look at this as potentially a threat to Intel. And I assume you look at this as an opportunity for IFS??

Randhir Thakur: Yeah, absolutely. At the most basic level, we can be a foundry partner for manufacturing these products, either through wafer processing or packaging. So our partnership with Amazon Web Services is a great example. They're leveraging our packaging capabilities to enable their data center infrastructure chips. But the chiplet revolution opens up entirely new possibilities. Cloud service providers are looking to create customized compute machines that incorporate accelerators with the goal of improving the data center performance for workloads such as AI. With our advanced 3D packaging technologies, these domain specific accelerators can be closely integrated as chiplets in the same package as a data center CPU, enabling significantly higher performance and reduce the power compared to placing accelerator cards near CPU boards. And we can go a step further by allowing our customers to mix and match their IP with our IP to create innovative design. A key part of the IFS strategy is to offer a broad range of leadership IP optimized for Intel process technologies. IFS is the only foundry to offer IP optimized for all three of the industry leading instruction set architectures, X86, ARM and RISC-V.

So we are enabling this new approach with our open chiplet platform. What was co-developed with leading CSPs to accelerate the package integration of customers accelerator IPS. So these are really exciting times for us.

Patrick Moorhead: Yeah, I'll have to admit when I saw your IDM2.0 announcement come out and I saw ARM and RISC and X86, my jaw dropped on the floor. I have over 30 years experience either. I used to be your biggest customer. I was one of your biggest competitors and now I've researched Intel for the last 11 years, so I feel like I know Intel pretty well. And your approach at IFS seems to be very open and collaborative. Maybe we say a little bit more open and collaborative than maybe what Intel has been known for in the past. I mean, why the new approach?

Randhir Thakur: Yeah. Thank you, Patrick. We firmly believe that open ecosystem unleashes the innovation and really democratize the compute. In fact, this is not really new for Intel. As you know, our history of mutual beneficial partnership with the PC ecosystem demonstrates our deep commitment. We did it with Intel inside campaign and now we are doing it with IDM 2.0, so not only are we opening our factories to the world, but we are opening our IP by offering X86 for the first time ever. So in foundry, a robust ecosystem is absolutely critical to helping the customers bring their designs to life. A semiconductor foundry is not simply a contract manufacturer. We are a deeply integrated partner that shares the entire journey from concept to final product. So this process would not be possible without support from a broad community of industry partners across EDA, IP and design services.

That's why we launched our IFS accelerator ecosystem. So beyond the foundational ecosystem, as you know we are also investing in new disruptive areas with a billion dollar innovation fund through our ICAP. And the fund is intended to invest in both the startups and established companies to help them scale. So this is well aligned with Intel's mission to improve the lives of every person on the planet. The expansion of the electronics industry is impacting the critical areas of society from climate change to healthcare. Our fund was established so that no innovative idea would be left behind. We want to leverage our global reach to help bring these disruptive players along and make an even bigger impact and help them. At the same time, the fund will help develop ecosystem around IFS as we build the business. Our strategy for RISC-V is a great example. So this new open instruction set architecture is creating tremendous opportunities for innovation. We are investing to strengthen the global RISC-V ecosystem and to position IFS as the foundry of choice for RISC-V. And we see a lot of pull from the customers in that direction.

Patrick Moorhead: Yeah. I appreciated the follow on two announcements.

Randhir Thakur: Yeah.

Patrick Moorhead: Because they filled in some of the blanks for me, the accelerator program got to the common methodology industry standard tools and your accelerator program answered the question around, how do some of these companies get funding to do some of the really cool designs that I think would fit nicely inside of IFS? And what I'd love to do is, I'd love to shift gears and focus in on the automotive market. Been very painful as I see and I think the way we started here is how did semiconductors be a household name? It might have been, hey, I can't buy my car because there's a semiconductor shortage out there. And quite frankly, it's been painful and it continues to wreak havoc on the supply chain. I'm curious how can IFS help the automotive industry if you're focused primarily on leading edge? Aren't the majority of these chips manufacturer on older technology nodes?

Randhir Thakur: I think this is a really great question. The automotive industry is also going through a transformation as you said. Supply chains are being disrupted. Electric and autonomous vehicles are requiring new semiconductor solutions. So combining Intel's technologies with Tower's auto certified portfolio already, really positions us to serve this market because we can add capital and capacity upon closure for Tower. And this will help address the current shortage and allow us to tap into a growing market. But in the longer term, the automotive OEMs are looking for a different partnership model with foundries. So the fragmented supply chains and legacy process technologies of today will not be able to support the increasing demand and the transition to more compute intensive applications. So in response, we have created a dedicated automotive group within IFS to bring together our technology offerings into a complete automotive solutions space. A key part of this initiative will be the development of open auto compute platform that will leverage chiplet based building blocks, as I said earlier, and advanced packaging technologies to build solutions that address the compute needs of really the next generation vehicles as well.

Patrick Moorhead: Yeah. I have never seen, since I've been covering the semiconductor space, how many auto manufacturers and tier ones, they only want direct relationships with the designers but they want direct relationships with the foundries.

Randhir Thakur: Yes.

Patrick Moorhead: And that's unprecedented and it has really shaken up the market. I think just given the design cycles will shake up this industry even more in the future.

Randhir Thakur: Yeah.

Patrick Moorhead: I have done a couple research reports on your acquisition of Tower and I may know some of the answers to these questions, but I think it's important that they hear this from you. Some of the questions I got were, hey, is this just a capacity play? Are there any specific technologies, interesting technologies that it brings to the table? And I think for most of all, hey, Tower really was looked at as a specialty play versus something in the broader industry. How does this help what you do overall at IFS?

Randhir Thakur: Patrick, I'm incredibly excited about Tower joining Intel. Tower has a pioneered really unique foundry business model focused on the specialty technologies, as you said. So this extends the useful life of existing process nodes, generating additional value and driving profitability for IFS. Their business compliments the IFS business. Through this combination, we'll have access to a portfolio of about 200, more than 200 customers, a strong platform for design enablement, and really over two decades of foundry experience. This is a winning solution for our customers. We are bringing together Tower's foundry DNA and analog strengths with Intel scale and ability to invest and leading edge logic process technologies. So when I share with our customers our total roadmap, including Tower, they get very excited that we have now really put in not only just the most advanced technologies, but brought along what they really need in the other areas to put their systems together. That's why I said the system level foundry.

Patrick Moorhead: Right. Yeah, in my note, Randhir, I talked about the Tower acquisition as giving you the capability to become an end-end player in this and I'll stick to that. And I want you to make me look really smart in the future so...

Randhir Thakur: Absolutely.

Patrick Moorhead: So when IDM 2.0 was first brought out and over some of the consecutive months, we saw some really big time logos that were discussed, pretty big customer engagements. I saw AWS, I saw Cisco and one of the biggest fabless customers on the block, even Qualcomm. But outside of what well, looked at as a little bit generic endorsements, there hasn't been a whole lot of detail, even though I pry and prod with every one of those companies. When are we going to hear more about this customer progress?

Randhir Thakur: Well, we have started to frankly, build on that Patrick, even in recent earnings Pat had announced. So this past year, our customer engagement has been just tremendous. Our pipeline

is robust with more than 10 qualified opportunities that are in advanced stages of engagement across our process and package offerings, which collectively represents a deal value of greater than $5 billion. We have over 30 test chips committed to Intel 16 this year. And we expect the first Intel 3 and Intel 18A customer test chips to tape out in the second half of this year. So, but it's important to recognize that foundry design cycles are long and engagement often brings well in advance of a product commitment. So we are at those stages where we are doing the early work with the customers. We are engaged in joint design processes as a result with several potential anchor customers, who are really the leaders in key market segments of compute, mobile and automotive. So when I think about our IFS journey, phase one was putting a stake in the ground last March when Pat announced the IDM 2.0, to demonstrate our commitment.

Phase two is building a foundation for deep customer relationships, which will be significantly enhanced as the Tower acquisitions comes on board. Soon, we'll be moving into the third phase and the next few years will be critical as we build our business on this strong foundation, Patrick.

Patrick Moorhead: So you have made many statements that have made my ears perk up over the last little over a year. And one of these was that, your overall goal is to be the number two foundry by the end of the decade, you have less than eight years to get there. I mean, how are you going to get there? How do you do it profitably, given the different operating models and cost structure, let's say a foundry business compared to an IDM?

Randhir Thakur: Oh, as a key strategic element of IDM 2.0, IFS supports Intel's long term profitable growth. So our existing offerings are already generating revenue and will grow steadily through the horizon. In Q1 IFS, revenue was about 283 million, and that was up 175% year over year on increased automotive demand, an initial revenue from Amazon and Cisco. We expect to hit a billion dollar run rate for the first time this year, as we continue to make progress. And as our leading edge offerings come online, we will rapidly scale our revenue. We also see significant demand for Tower's offerings and provide more guidance on that in the future. Lastly, our smart CAPEX approach will fully leverage Intel capacity and utilize the synergies with existing Intel investments, infrastructure and OPEX. So the investments being made now in clean room shelves, you heard about our announcement and technology development, five nodes in four years, it will support our leading edge foundry growth. We'll stage additional investments in line with customer milestones and we'll partner with public and private sector investors to amplify our impact. In line with overall industry trends, we'll secure customers prepayments wherever necessary.

So the IDM 2.0 model enables IFS to scale rapidly and use capital efficiently to serve customers and to deliver the attractive returns over time. And as you said, eight years, we have to run very fast but we have a track to run in, and we believe that opportunities are there for us and just have to make sure we execute.

Patrick Moorhead: Yeah, Randhir, I have private conversations with some of your biggest potential customers out there, executives at these companies and I just want to end saying, all of them have universally said that they'd like to see Intel IFS succeed. They want there to be more competition, more capacity, more partnership and overall more competition. And that's exactly what you're trying

to put together here at IFS with some gigantic investments and a really big bet from the overall company.

Randhir Thakur: Thank you very much.

Patrick Moorhead: And I'd like to thank you for coming on the show and kicking off the Six Five summit semiconductor track. I think it's really going to lead the way for the rest of the speakers.

Randhir Thakur: Thank you so much, Patrick. Good luck with the rest of the program and appreciate the conversation. Thank you very much.

Patrick Moorhead: Thanks so much. Thank you.

Randhir Thakur: Thank you.